Objections to the Specification

The applicant has amended the cross-reference claim to priority in the specification as recommended by the Examiner.

The applicant submits herewith a new substitute application under 37 CFR 1.125(a) with proper consecutive page numbers and all sequences followed by their sequence identifier by indicating where amendments were/are made under 37 CFR1.121 (MPEP 608.01(q)).[4] A clean copy of the marked up substitute application is also provided. Attorneys for the applicant also state herein, pursuant to 37 CFR § 1.125, affirming that no new matter is added and that the new substitute specification includes the same changes as are indicated in the marked-up copy of the original specification showing additions and deletions. The applicant submits that this response overcomes or obviates the current objections to the specification.

Accordingly, the applicant respectfully requests the Examiner to withdrawal these objections.

Objections to the claims

As pointed out by the Examiner, claims 34-59 were pending in the subject application at the time of this response.[5]

The applicant herein cancels claims 34-46 by means of the amendment presented *supra*. Accordingly, only claims 47-59 are now pending. Therefore, the applicant respectfully requests the Examiner to withdrawal the objections to the previously misnumbered and duplicate claims under 37 CFR 1.75.

Non-statutory double patenting rejection

The applicant respectfully defers the filing of a terminal disclaimer under 37 CFR 1.321(c), to obviate the rejection, until allowance is indicated.

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[4] The applicant respectfully refers the Examiner to an amendment and substitute specification submitted on May 23, 2001 under 37 CFR 1.125(a) with proper consecutive page numbers and all sequences followed by their sequence identifier by indicating where previous amendments were made under 37 CFR1.121 (MPEP 608.01(q)).

[5] Applicant herein acknowledges, as pointed out by the Examiner, that claims "14-26" added by the preliminary amendment of December 20, 2000 are properly renumbered as 34-46. We also acknowledge the Examiner's renumbering of claims"34-46", added by the amendment of February 11, 2002, as now properly 47-59. The claims are now properly numbered in accord with 37 CFR 1.126.

1. **REJECTIONS UNDER 35 USC § 112, SECOND PARAGRAPH**

Claims 54-57 and 59 were rejected because they depended from cancelled claims.

The applicant has amended claims 54-57 and 59 to depend from now pending claims. In view of the amendments presented, the applicant respectfully requests the Examiner to withdrawal the rejection.

2. **REJECTIONS UNDER 35 USC § 112, FIRST PARAGRAPH**

Claims 34-59 were rejected as alleged to contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The applicant addresses the rejection with regard to claims 47-59 (Appendix herewith), which are now pending:

The applicant respectfully wishes to clarify the intended scope of the claims presented. Referring to Claim 47, for example, the nucleotide sequence is "*of sufficient length to regulate the level of ACC synthase gene expression*". This does not seek to claim sequences that necessarily completely and selectively inhibit ACC synthase gene expression in plants as seems to be suggested by the Examiner. Instead, Claims 47, 48 and 51 are directed to nucleotide sequences that are:

(i) defined structurally by their high level of sequence similarity to SEQ ID NOS: 1, 5, 7 or 9; respectively, and

(ii) defined functionally of sufficient length to regulate the level of ACC synthase gene expression.

The level of experimentation required by a person of ordinary skill in the art would be minimal in order to make and use sequences falling within the scope of Claims 47, 48 and 51. The claims do not make the additional requirement that the skilled person identify only those sequences that completely and selectively inhibit ACC synthase gene expression.

The applicant, moreover, respectfully traverses the arguments with regard to the unpredictability of the subject matter of the claims directed to production of transgenic plants with inhibited fruit senescence, particularly in view of Robbins *et al.*, 1998, Plant Physiol. 116 1133 and van der Krol *et al.*, 1990, Plant Mol. Biol. 14 457 .

With regard to van der Krol *et al.*, 1990, silencing of the petunia Chalcone synthase (CHS) gene could be achieved using either the full-length gene or a 157 base pair fragment complementary to the 3' end. Contrary to the Examiner's statement, the fact that the 3' fragment worked as well as the full-length gene does not mean that the art is unpredictable. All this means is that there is variability in the efficacy of one sequence compared to another. This is not evidence of unpredictability as to whether a sequence will work at all -or- function as claimed by the applicant.

Similarly, the Examiner's comments with regard to Robbins *et al.* and variability according to fragment length do not support the position that the art is so unpredictable that undue experimentation is required to employ the applicant's structurally and functionally defined sequences that regulate ACC synthase gene expression.

The Federal Circuit has repeatedly held that "the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation'." *In re Wright,* 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). Nevertheless, not everything necessary to practice the invention need be disclosed. In fact, what is well-known is best omitted. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991). All that is necessary is that one skilled in the art be able to practice the claimed invention, given the level of knowledge and skill in the art. Further, the scope of enablement must only bear a "reasonable correlation" to the scope of the claims. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970).

The applicant respectfully draws the attention of the Examiner to the publication of a large number of successful antisense examples of regulation in transgenic plants prior to the effective U.S. filing date of the present application. In this regard, for convenience we refer to Table 1 of Bourque *et al.*, 1995, Plant. Sci. 105 125, included herewith, that provides an extensive list of successful antisense strategies for regulating gene expression in plants. Section 4.5 titled *Crop Improvement,* at pages 132 and 133, is of particular relevance to the present invention and provides a far more positive view than the Examiner's as to the general

applicability and accessibility of this technology. In summary, Bourque *et al.*, sharply contrasts the Examiner's position. In view of the state of the art at the time of the invention, as indicated by Bourque *et al.* and in view of the Applicant's disclosure, the use of sequences as structurally and functionally defined by the applicant to regulate ACC synthase is, and was at the time of the invention, indeed a predictable area.

The applicant respectfully submits that, although the Examiner has identified examples in the prior art of variability in terms of the *level* of efficacy of certain gene fragments in antisense expression, the instant claims 47-59 now encompass subject matter that can be practiced, made and used, by a person of ordinary skill in the art, using the disclosure provided in the written description, without necessary recourse to undue experimentation.

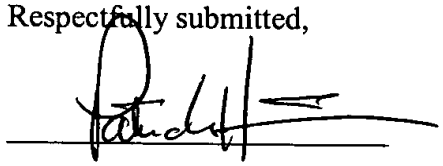
The Applicant, therefore, respectfully requests the Examiner to withdrawal the rejection with regard to the claims now pending, 47-59.

* * *

For all the foregoing reasons, the applicant submits that Claims 47-59 are in condition for allowance. Early action toward this end is courteously solicited. *The Examiner is kindly encouraged to telephone the undersigned in order to expedite any detail of the prosecution*.

A check in the amount of $920.00 to cover the cost of the three-month extension is enclosed. The Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 13-2165.

Respectfully submitted,



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Appendix

COPY OF THE PENDING CLAIMS AS SET FORTH
IN THIS RESPONSE/AMENDMENT

47. A nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression, and which hybridizes under high stringency conditions with a sequence of nucleotides set forth in SEQ ID NO:1, wherein the high stringency conditions are selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour.

48. A nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression, and which hybridizes under high stringency conditions with a sequence of nucleotides set forth in SEQ ID NO:5, wherein the high stringency conditions are selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour.

49. A method of producing a transgenic papaya plant with inhibited fruit senescence including the steps of:

(a) introducing into a papaya plant, plant part or plant cell a vector comprising a nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression and which hybridizes with a sequence of nucleotides set forth in SEQ ID NO:5 under high stringency conditions selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour;

wherein said isolated nucleotide sequence is operably linked, in a sense orientation, to one or more regulatory nucleotide sequences; and

(b) growing said plant, or regenerating said plant part or said plant cell to

produce the transgenic papaya plant.

50. A method of producing a transgenic papaya plant with inhibited fruit senescence including the steps of:

(a) introducing into a papaya plant, plant part or plant cell a vector comprising a nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression and which hybridizes with a sequence of nucleotides set forth in SEQ ID NO:5 under high stringency conditions selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour;

wherein said nucleotide sequence is operably linked, in an antisense orientation, to one or more regulatory nucleotide sequences; and

(b) growing said plant, or regenerating said plant part or said plant cell to produce the transgenic papaya plant.

51. A nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression, and which hybridizes under high stringency conditions with a sequence of nucleotides set forth in SEQ ID NO:7 or SEQ ID NO:9, wherein the high stringency conditions are selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour.

52. A method of producing a transgenic mango plant with inhibited fruit senescence comprising:

(a) introducing into a mango plant, plant part or plant cell a vector comprising a nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression and which hybridizes with a sequence of nucleotides set forth in SEQ ID NO:7 or SEQ ID NO:9 under high stringency conditions selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour;

wherein said nucleotide sequence is operably linked, in a sense orientation, to one or more regulatory nucleotide sequences; and

(b) growing said plant, or regenerating said plant part or said plant cell to produce the transgenic mango plant.

53. A method of producing a transgenic mango plant with inhibited fruit senescence including the steps of:

(a) introducing into a mango plant, plant part or plant cell a vector comprising an isolated nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression and which hybridizes with a sequence of nucleotides set forth in SEQ ID NO:7 or SEQ ID NO:9 under high stringency conditions selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour;

wherein said nucleotide sequence is operably linked, in an antisense orientation, to one or more regulatory nucleotide sequences; and

(b) growing said plant, or regenerating said plant part or said plant cell to produce the transgenic mango plant.

54. (*Amended*) A transgenic papaya plant produced by the method of [Claim 16 or Claim 17] Claim 49 or Claim 50.

55. (*Amended*) A papaya fruit obtained from the transgenic papaya plant of Claim [21] 54.

56. (*Amended*) A transgenic mango plant produced by the method of [Claim 10 or Claim 20] Claim 52 or Claim 53.

57. (*Amended*) A mango fruit obtained from the transgenic mango plant of Claim [23] 56.

58. A vector comprising at least one copy of a nucleotide sequence which is of sufficient length to regulate the level of ACC synthase gene expression and which hybridizes under high stringency conditions with a sequence of nucleotides set forth in SEQ ID NO: 1, SEQ ID NO: 5, SEQ ID NO: 7 or SEQ ID NO: 9, wherein the high stringency conditions are selected from the group consisting of:

(i) 0.1 x SSC/0.1% SDS at about 68°C for at least about 20 minutes; and

(ii) 0.2 x SSC/0.1% SDS at about 68°C for about one hour.

59. (*Amended*) The vector of Claim [25] 58 wherein said nucleotide sequence is operably linked to at least one regulatory nucleotide sequence.

* * *